

REMARKS

Claims 1-6, 8-17, and 22-35 are pending. Of these claims, claims 1, 9, 22, 30-32, and 34 are independent, and claims 2-6, 8, 10-17, 23-29, 33, and 35 are dependent.

In the outstanding Office Action, claims 1-6, 8, 9, 12, 14, 15, 17, 22, 23, and 25-35 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,090,258 to Yamasaki et al. ("Yamasaki"); claims 1-6, 8-10, 12-15, 17, 26-29, 32, and 33 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamasaki in view of U.S. Patent No. 5,967,224 to Iwanaga et al. ("Iwanaga"); claims 16, 24, 30, 34, and 35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamasaki; and claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamasaki in view of U.S. Patent No. 6,293,161 to Hanashiro et al. ("Hanashiro").

Applicants respectfully traverse the rejection of independent claims 1-6, 8, 9, 12, 14, 15, 17, 22, 23, and 25-35, under 35 U.S.C. § 102(b) as being anticipated by Yamasaki.

Yamasaki discloses a dilution tunnel system including an inlet pipe 4 into a dilution tunnel 5, a plurality of nozzles 10 between the downstream end of inlet pipe 4 and a mixing orifice 7, and a flow-rectifying plate 13 disposed in dilution tunnel 5 between a butterfly valve 24 and inlet pipe 4. Yamasaki, Col. 4, Ln. 23-51. With respect to claims 1-6, 8, 9-17, 26-30, and 32-35, the Examiner argues on page 2 of the Office Action that Yamasaki teaches, "introducing a first DILUTION AIR stream via stream passages in rectifying plate 13 into a mix chamber; directing a second stream via line 4; combining the streams; and discharging the streams via port 7." Because the Examiner has indicated that a first stream is introduced by passages in rectifying plate

13 and is discharged through port 7, it appears that the Examiner has characterized the section of dilution tunnel 5 extending between flow-rectifying plate 13 and mixing orifice 7 as being a mixing chamber.

With respect to independent claims 22-25, 31, and 32-35, the Examiner argues on page 3 of the Office Action that Yamasaki's mixing chamber includes, "a volume 5 with first (region of 7) and second (right hand side) ends; inlet opening 7 that receives a first stream (from pipe 4) and plurality of symmetrically oriented second openings (ends of nozzles 10) that receive a second stream of gas from source 19; an exit at the right hand of volume 5 that converges." Thus, it appears that for independent claims 22, 31, 32, and 34, the Examiner has characterized the section of dilution tunnel 5 in Yamasaki, beginning at mixing orifice 7 and extending downstream therefrom, as being a mixing chamber.

Independent claim 1 discloses, *inter alia*, "a method of mixing a first stream of gas with a second stream of gas, comprising: introducing a first stream of gas into a mixing chamber via a plurality of first stream passages . . . directing a second stream of gas into the mixing chamber via at least one second stream passage . . . the method further including at least one of the following characteristic factors: . . . (2) providing walls of the mixing chamber with an absence of structure extending into the mixing chamber; (3) introducing the first and second streams of gas from the plurality of first stream passages and the second stream passage into the mixing chamber with a substantially well-developed flow; and (4) introducing at least one of the first and second streams of gas, as the exhaust gas, into the mixing chamber from more than one

entrance port.” Yamasaki fails to disclose or suggest at least all of these limitations in independent claim 1.

As shown in FIG. 1 of Yamasaki, the section of dilution tunnel 5 that the Examiner has characterized as being the mixing chamber has a plurality of structures extending into it, including, for example, pipe 4 and nozzles 10. Thus, Yamasaki does not disclose providing walls of the mixing chamber with an absence of structure extending into the mixing chamber, because pipe 4 and nozzles 10 extend into dilution tunnel 5.

For at least this reason, in Yamasaki, the dilution air inlet (left side of dilution tunnel 5), butterfly valve 24, and flow-rectifying plate 13, each inhibit the introduction of the dilution air as a substantially well-developed flow into the section of dilution tunnel 5 between flow-rectifying plate 13 and mixing orifice 7. This is because dilution tunnel 5 undergoes a change in cross-section upstream of butterfly valve 24 (approximately midway between butterfly valve 24 and the dilution air inlet in FIG. 1), and because flow-rectifying plate 13 and butterfly valve 24 are both protrusions or disturbances to the dilution air flow. Applicants direct the Examiner's attention to page 5 of Applicants' Specification, that explains how a well-developed flow arises in a long pipe if the flow is not subject to any protrusions, changes in cross-section, or other disturbances. Thus, because the dilution air in Yamasaki passes through a section of dilution tunnel 5 having a changing cross-section, passes over a butterfly valve 24 protruding into dilution tunnel 5 and flow rectifying plate 13, Yamasaki cannot disclose introducing the first and second streams of gas from the plurality of first stream passages and the second stream passage into the mixing chamber with a substantially well-developed

flow, as required by claim 1. For a more detailed explanation of the disadvantages associated with the Yamasaki system and the differences between the Yamasaki system and Applicants' embodiments, Applicants direct the Examiner to the paragraph bridging pages 1 and 2 of the Specification, and also the paragraph bridging pages 2 and 3 of the same.

Furthermore, Yamasaki discloses introducing exhaust gas into dilution tunnel 5 from a single inlet pipe 4, rather than from more than one entrance port. Thus, Yamasaki does not disclose introducing at least one of the first and second streams of gas, as the exhaust gas, into the mixing chamber from more than one entrance port, as recited in independent claim 1.

For all of the above reasons, Yamasaki fails to disclose or suggest all of the aspects of independent claim 1, for example, "a method of mixing a first stream of gas with a second stream of gas, comprising: introducing a first stream of gas into a mixing chamber via a plurality of first stream passages . . . directing a second stream of gas into the mixing chamber via at least one second stream passage . . . the method further including at least one of the following characteristic factors: . . . (2) providing walls of the mixing chamber with an absence of structure extending into the mixing chamber; (3) introducing the first and second streams of gas from the plurality of first stream passages and the second stream passage into the mixing chamber with a substantially well-developed flow; and (4) introducing at least one of the first and second streams of gas, as the exhaust gas, into the mixing chamber from more than one entrance port," as recited in independent claim 1. Accordingly, for at least the above reasons, Applicants

respectfully request the withdrawal of the rejection of independent claim 1, and request the timely allowance thereof.

Claims 2-6, 8, 26, and 28 depend either directly or indirectly from independent claim 1, and are therefore allowable for at least the same reasons stated above that independent claim 1 is allowable. In addition, each of these dependent claims recites unique combinations that are neither taught nor suggested by the cited art, and therefore each is also separately patentable.

Independent claim 9 recites, *inter alia*, "an apparatus for mixing a first and a second stream of gas, comprising: a first plurality of passages configured to direct the first stream of gas . . . a mixing chamber having first and second ends . . . the method further including at least one of the following characteristic factors: . . . (2) wherein the mixing chamber has an absence of structure extending into the mixing chamber; (3) wherein the first plurality of passages and the second stream passage are configured to introduce the first and second streams of gas into the mixing chamber with a substantially well-developed flow; and (4) wherein at least one of the first plurality of passages and the second stream passage is configured to introduce at least one of the first and second streams of gas, as an exhaust gas, into the mixing chamber from more than one entrance port." As explained above with respect to independent claim 1, Yamasaki fails to disclose or suggest these claim limitations, and therefore, Applicants submit that independent claim 9 is allowable and request that the rejection of claim 9 be withdrawn.

Claims 10-17, 27, and 29 depend either directly or indirectly from independent claim 9, and are therefore allowable for at least the same reasons stated above that

independent claim 9 is allowable. In addition, each of these dependent claims recites unique combinations that are neither taught nor suggested by the cited art, and therefore each is also separately patentable.

Independent claim 22 recites, *inter alia*, “a mixing chamber for mixing a first stream of gas with a second stream of gas, comprising: . . . a first inlet opening configured to receive the first stream of gas into the mixing chamber, the first inlet opening located at the first end; a plurality of second inlet openings configured to receive the second stream of gas in the mixing chamber, the plurality of second inlet openings symmetrically positioned with respect to the first inlet opening” Yamasaki fails to disclose or suggest at least all of these limitations in independent claim 22.

The section of dilution tunnel 5 extending downstream from mixing orifice 7, which the Examiner has characterized as being a mixing chamber, has only a single inlet at mixing orifice 7 that receives both the dilution gas and the exhaust gas into the mixing chamber. The nozzles 10 in Yamasaki are not inlet openings into the mixing chamber, but rather, are outlet openings configured to supply dilution gas upstream of the mixing chamber. Because nozzles 10 in Yamasaki are outlet openings upstream of the mixing chamber, Yamasaki fails to disclose or suggest, “a mixing chamber for mixing a first stream of gas with a second stream of gas, comprising: . . . a first inlet opening configured to receive the first stream of gas into the mixing chamber, the first inlet opening located at the first end; a plurality of second inlet openings configured to receive the second stream of gas in the mixing chamber, the plurality of second inlet openings symmetrically positioned with respect to the first inlet opening,” as recited in independent claim 22. Accordingly, for at least the above reasons, Applicants

respectfully request the withdrawal of the rejection of independent claim 22, and request the timely allowance thereof.

Claims 23-25 depend either directly or indirectly from independent claim 22, and are therefore allowable for at least the same reasons stated above that independent claim 22 is allowable. In addition, each of these dependent claims recites unique combinations that are neither taught nor suggested by the cited art, and therefore each is also separately patentable.

Independent claim 30 recites, *inter alia*, “a method of mixing a first stream of gas with a second stream of gas, comprising: introducing a first stream of gas into a mixing chamber . . . directing a second stream of gas into the mixing chamber . . . providing walls of the mixing chamber with an absence of structure extending into the chamber; and introducing at least one of the first and second streams of gas into the mixing chamber as an entire exhaust gas flow.” As explained above with respect to independent claim 1, Yamasaki fails to disclose or suggest providing the walls of the mixing chamber with an absence of structure extending into the chamber. On page 2 of the Office Action, the Examiner argues that, “the mixing chamber is initially produced (made) (“providing”, line 4 from last of claim 30) without extending structure.” This argument about the making or production of dilution tunnel 5 in Yamasaki is unsupported by the drawings and disclosure in Yamasaki. Furthermore, regardless of the manner in which dilution tunnel 5 is produced, dilution tunnel 5, as shown and described in Yamasaki, is provided with an inlet pipe 4 and nozzles 10 extending inwardly from its walls. Further still, dilution tunnel 5 is not a “mixing chamber” until mixing orifice 7, inlet pipe 4, and nozzles 10 are present. Thus, the Examiner’s rejection

is improper because Yamasaki does not disclose providing walls of the mixing chamber with an absence of structure extending into the mixing chamber, because pipe 4 and nozzles 10 extend into dilution tunnel 5.

In addition, in Yamasaki, the exhaust gas emitted from an automobile engine is introduced into a multipipe flow divider 2 which comprises a plurality of flow-dividing pipes 1, wherein the exhaust gas is discharged into the atmosphere from the flow divider 2, except that one of the flow-dividing tubes 1 extends out of the flow divider 2 and acts as inlet pipe 4. Yamasaki, Col. 4, Ln. 23-27. Thus, the exhaust gas introduced through inlet pipe 4 is not an entire exhaust gas flow, but rather, is only a fraction of the entire exhaust gas flow. As such, Yamasaki fails to disclose or suggest introducing at least one of the first and second streams of gas into the mixing chamber as an entire exhaust gas flow.

For all of the above reasons, Yamasaki fails to disclose or suggest, "a method of mixing a first stream of gas with a second stream of gas, comprising: introducing a first stream of gas into a mixing chamber . . . directing a second stream of gas into the mixing chamber . . . providing walls of the mixing chamber with an absence of structure extending into the chamber; and introducing at least one of the first and second streams of gas into the mixing chamber as an entire exhaust gas flow," as recited in independent claim 30. Accordingly, for at least the above reasons, Applicants respectfully request the withdrawal of the rejection of independent claim 30, and request the timely allowance thereof.

Independent claim 31 recites, *inter alia*, "an apparatus for mixing a first and a second stream of gas, comprising: a first plurality of passages . . . a second stream

passage . . . and wherein at least one of the first plurality of passages and the second stream passage is configured to introduce at least one of the first and second streams of gas into the mixing chamber as an entire exhaust gas flow.” As explained above with respect to independent claim 30, Yamasaki fails to disclose or suggest introducing at least one of the first and second streams of gas into the mixing chamber as an entire exhaust gas flow. Accordingly, for at least the above reasons, Applicants respectfully request the withdrawal of the rejection of independent claim 31, and request the timely allowance thereof.

Independent claim 32 recites, *inter alia*, “a method of mixing an exhaust gas with a dilution gas for an emissions sampling system, comprising: . . . developing a substantially well-developed flow stream of the dilution gas upstream of the exhaust gas passage.” As explained above with respect to independent claim 1, Yamasaki fails to disclose or suggest this limitation. For at least this reason, Applicants respectfully request the withdrawal of the rejection of independent claim 32, and request the timely allowance thereof.

Claim 33 depends directly from independent claim 32, and is therefore allowable for at least the same reasons stated above that independent claim 32 is allowable. In addition, claim 33 recites unique combinations that are neither taught nor suggested by the cited art, and therefore is also separately patentable.

Independent claim 34 recites, *inter alia*, “an emissions sampling system for mixing an exhaust gas with a dilution gas, comprising: . . . a sampling device in the mixing chamber to sample the gas in the mixing chamber, wherein the dilution gas passage is configured to create a substantially well-developed flow stream of the

dilution gas upstream of the exhaust gas passage.” Yamasaki does not disclose or suggest a sampling device in the section of dilution tunnel 5 between flow-rectifying plate 13 and mixing orifice 7; nor does Yamasaki disclose or suggest a sampling device in the section of dilution tunnel 5 beginning at mixing orifice 7 and extending downstream therefrom. Thus, Yamasaki does not disclose or suggest a sampling device in the mixing chamber for either mixing chamber characterization of Yamasaki offered by the Examiner. Furthermore, as explained above with respect to independent claim 1, Yamasaki fails to disclose or suggest creating a substantially well-developed flow stream. Therefore, Yamasaki fails to disclose or suggest, “an emissions sampling system for mixing an exhaust gas with a dilution gas, comprising: . . . a sampling device in the mixing chamber to sample the gas in the mixing chamber, wherein the dilution gas passage is configured to create a substantially well-developed flow stream of the dilution gas upstream of the exhaust gas passage,” as recited in independent claim 34, and accordingly, Applicants respectfully request the allowance of independent claim 34.

Claim 35 depends directly from independent claim 34, and is therefore allowable for at least the same reasons stated above that independent claim 34 is allowable. In addition, claim 35 recites unique combinations that are neither taught nor suggested by the cited art, and therefore is also separately patentable.

Applicants respectfully traverse the rejection of claims 1-6, 8-10, 12-15, 17, 26-29, 32, and 33 under 35 U.S.C. § 103(a) as being unpatentable over Yamasaki in view of Iwanaga. As discussed above, Yamasaki does not disclose or suggest all of the claimed limitations in independent claims 1, 9, and 32. Iwanaga discloses a vehicle heating apparatus having a plate 34 with through holes 50a and 50b. Iwanaga, Col. 3,

Ln. 19-36. On page 4 of the Office Action, the Examiner argues that, "Iwanaga teaches that a rectifying plate (line plate 13 of Yamasaki) has passages, or in the alternative, it would have been obvious to employ Iwanaga's plate as Yamasaki calls for a rectifying plate." However, modifying or replacing flow rectifying plate 13 of Yamasaki with plate 34 of Iwanaga, still fails to remedy the deficiencies of Yamasaki noted above with respect to independent claims 1, 9, and 32. For at least this reason, neither Yamasaki nor Iwanaga, alone or in combination, renders independent claims 1, 9, and 32 obvious. Reconsideration is requested.

Claims 2-6, 8, 10, 12-15, 17, 26-29, and 33 depend either directly or indirectly from independent claims 1, 9, and 32, and are therefore allowable for at least the same reasons stated above that independent claims 1, 9, and 32 are allowable. In addition, each of these dependent claims recites unique combinations that are neither taught nor suggested by the cited art, and therefore each is also separately patentable.

Applicants respectfully traverse the rejection of claims 16, 24, 30, 34, and 35 under 35 U.S.C. § 103(a) as being unpatentable over Yamasaki.

Claim 16 depends indirectly from independent claim 9. As discussed above with respect to independent claim 9, Yamasaki is deficient for at least the reason that it fails to disclose or suggest all of the limitations in independent claim 9. The Examiner's proposed modification on page 5 of the Office Action, requiring the application of an annular manifold to the device in Yamasaki, fails to remedy the deficiencies in Yamasaki noted above with respect to independent claim 9. Thus, claim 16 is allowable for at least the same reasons stated above that independent claim 9 is allowable.

Furthermore, to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; and the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP 2143. On page 5 of the Office Action, the Examiner argues that “it is known to apply annular manifold to introduce fluid from one line into another to permit for efficient fluid flow.” However, as shown in FIG. 1 of Yamasaki, nozzles 10 extend from a central portion of an end of gas source 19. The modification to Yamasaki proposed in the Office Action does not address how gas source 19 could fluidly communicate with nozzles 10 if gas source 19 were to become an annular chamber. Without a teaching addressing this critical aspect of the Yamasaki system, the proposed modification is incomplete and thus, one would not have been motivated to make such a modification. For at least this reason, Applicants submit that the rejection of claim 16 is improper and should be withdrawn.

If the Examiner maintains this rejection in the next Office Action, Applicants request that a reference be provided that not only addresses the modification of the Yamasaki system so that gas source 19 is an annular chamber, but also addresses how such a modification would allow gas source 19 to remain in fluid communication with nozzles 10. Applicants submit that a reference is required because the use of an annular chamber as a manifold, and the use of an annular chamber that allows for fluid communication on a central end portion thereof with nozzles, are not capable of instant and unquestionable demonstration as being well-known. MPEP 2144.03.

Claim 24 depends directly from independent claim 22. As discussed above with respect to independent claim 22, Yamasaki is deficient in that it fails to disclose or suggest all of the limitations in independent claim 22. The Examiner's proposed modification of using steel in the device in Yamasaki fails to remedy the deficiencies in Yamasaki noted above with respect to independent claim 22. Thus, claim 24 is allowable for at least the same reasons stated above that independent claim 22 is allowable.

Furthermore, claim 24 recites, *inter alia*, that the first end, the second end, and walls have internal surfaces formed of electro-polished, passivated stainless steel. On page 5 of the Office Action, the Examiner argues that Yamasaki's system suggests the use of steel to allow for an inert and fluidly secure system. To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; and the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP 2143. The Examiner has failed to establish a *prima facie* case of obviousness at least because, contrary to the Examiner's assertion, there is no suggestion or motivation in Yamasaki to use steel. Additionally, Applicants submit that a reference is required because forming internal surfaces of a first end, second end, and walls (of a mixing chamber) of electro-polished, passivated, stainless steel is not capable of instant and unquestionable demonstration as being well-known. MPEP 2144.03.

As discussed above with respect to independent claim 30, Yamasaki is deficient for at least the reason that it fails to disclose or suggest, "a method of mixing a first stream of gas with a second stream of gas, comprising: introducing a first stream of gas into a mixing chamber . . . directing a second stream of gas into the mixing chamber . . . providing walls of the mixing chamber with an absence of structure extending into the chamber; and introducing at least one of the first and second streams of gas into the mixing chamber as an entire exhaust gas flow." The Examiner's proposed modification of Yamasaki, to separately make elements and then assemble them, fails to remedy the deficiencies in Yamasaki noted above with respect to independent claim 30. Thus, independent claim 30 is allowable for at least the same reasons stated above in the discussion of the rejection of claim 30 under 35 U.S.C. § 102(b). Reconsideration is requested.

As discussed above with respect to independent claim 34, Yamasaki is deficient for at least the reason that it fails to disclose or suggest, "an emissions sampling system for mixing an exhaust gas with a dilution gas, comprising: . . . a sampling device in the mixing chamber to sample the gas in the mixing chamber, wherein the dilution gas passage is configured to create a substantially well-developed flow stream of the dilution gas upstream of the exhaust gas passage." The Examiner's proposed modification of Yamasaki to sample a mixture of gas in dilution tunnel 5 fails to remedy the deficiencies in Yamasaki noted above with respect to independent claim 34. Even if sampling could be performed in the manner suggested by the Examiner, Yamasaki still would not have a dilution gas passage configured to create a substantially well-developed flow stream of the dilution gas upstream of the exhaust gas passage.

Accordingly, independent claim 34 is allowable for at least these reasons.

Reconsideration is requested.

Claim 35 depends directly from independent claim 34, and is therefore allowable for at least the same reasons stated above that independent claim 34 is allowable. In addition, claim 35 recites unique combinations that are neither taught nor suggested by the cited art, and therefore is also separately patentable.

Applicants respectfully traverse the rejection of claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Yamasaki in view of Hanashiro. Hanashiro fails to remedy the deficiencies in Yamasaki noted above with respect to independent claim 9. Thus, because claim 11 depends indirectly from independent claim 9, claim 11 is allowable for at least the same reasons stated above that independent claim 9 is allowable. In addition, claim 11 recites unique combinations that are neither taught nor suggested by the cited art, and therefore is also separately patentable.

In view of the foregoing remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

The Office Action contains characterizations of the claims and the related art with which Applicants do not necessarily agree. Unless expressly noted otherwise, Applicants decline to subscribe to any statement or characterization in the Office Action.

Please grant any extensions of time required to enter this response and charge
any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: January 3, 2006

By: 

Roland G. McAndrews
Reg. No. 41,45